DESCRIPTION OF MAP UNITS SURFICIAL DEPOSITS

poorly defined lower terraces

Qf Fluvial deposits (Holocene)— Unconsolidated or poorly consolidated river deposits consisting of moderately sorted, sub-angular to well-rounded boulders, gravel, sand, and silt; locally may include older river deposits on poor-

ly defined lower terraces Qcl Colluvium (Holocene and Pleistocene)—Unconsolidated or poorly consolidated slope deposits consisting of moderately sorted, sub-angular to angular boulders, gravel, sand, and silt; locally may include older river deposits on

Qls Landslide deposits (Holocene and Pleistocene)—Chaotic, angular fragments of weathered and fresh bedrock and colluvium, as clast-supported or mud matrix supported diamict derived from upslope. Includes areas of hummocky topography inferred to be underlain by landslide deposits Qft Fluvial terrace deposits (Pleistocene)—Moderately sorted, well-rounded to sub-rounded, semi-consolidated stratified gravel, sand, and silt on elevated

terraces along major drainages Qoft Older Fluvial terrace deposits (Pleistocene)— Moderately sorted, well rounded to sub-rounded, stratified gravel, sand, and silt on highest elevated terraces along major drainages, commonly more deeply weathered and consolidated than lower terrace deposits ROCKS OF THE CASCADE VOLCANIC ARC

Volcanic, intrusive and sedimentary rocks Td Upper dacite (late Eocene)—Pyroxene dacite flows, platy, flow foliated, light gray where fresh, weathers red-brown

Tuff of Bond Creek (late Eocene)—Divided into: Upper unit (late Eocene)—Moderately to poorly welded rhyolitic ash flow tuff consisting of white to pale gray vitric crystal tuff; contains broken and partially resorbed quartz, plagioclase and sanidine(?) with minor biotite, sphene, disseminated opaques and trace amounts of very fine grained euhedral amphibole, epidote and tourmaline that may be vapor phase crystallization. Includes rare xenoliths of mica schist; approximately 120 to 150 meters thick

Lower unit (late Eocene)—Moderately to poorly welded rhyolitic ash flow tuff; white to pale grey weathering, quartz and plagioclase phyric, crystal rich, trace white mica and epidote, rare rounded and resorbed biotite, abundant opaques, mafic minerals strongly altered,; approximately 120 meters thick; interpreted to be lower cooling unit of Tuff of Bond Creek. K-Ar age of 34.9 Ma determined from outcrops in adjacent Medford 2° quadrangle (Smith, 1980)

Tsf Rhyolite and dacite flows (late Eocene)—Light gray to white, plagioclase and quartz phyric, flow banded to massive, locally hydrothermally altered rhyolite and dacite flows

weathering, aphyric, fine grained to aphanitic, columnar jointed to platy basalt flows making up Brown Mountain. Upper part of sequence consists of plagioclase-rich phyric basalt flows along ridge top Andesite flows (late Eocene)—Andesitic flows and amygdaloidal flow breccia, dominantly plagioclase and plagioclase-clinopyroxene porphyritic, with trace amounts of sphene and apatite, massive, locally columnar jointed; locally overlain by dacitic plagioclase phyric unit; approximately 120

> to 180 meters thick Volcanolithic sandstone, conglomerate, and laharic breccia (late Eocene)—Greenish gray, indurated volcanic sandstone, silt and conglomerate containing porphyritic andesite, basalt, and silicic clasts; interbedded with andesitic and dacitic laharic breccia locally consisting of chaotic blocks of sedimentary rock, and rare andesite flows and silicic tuff breccia Colestin Formation (late Eocene?)—Sedimentary and volcaniclastic rocks,

Basalt of Brown Mountain (late Eocene)—Dark gray to black, brown

Fluvial and shallow marine sedimentary unit consisting of boulder, cobble and pebble conglomerate sandstone and tuffaceous sandstone, pale whitish, orange and ochre weathering, well-rounded to subangular clasts of Klamath lithologies, including schistose graywacke, pebble conglomerate of the Days Creek and Riddle Formations, porphyritic volcanic rocks, chert. Angular to subangular arkosic sandstone with little or no mica, and gritty-Plutonic derived sandstone that resembles disarticulated, deeply weathered diorite, poorly consolidated, matrix supported, conglomerate clasts commonly imbricated: marine fossils found at one locality in the Lane Mountain Quadrangle, massive red sandstone with well-developed groove casts observed at one locality; approximately 300 to 400 meters thick Intrusive Rocks

Diabase and basalt intrusions (late and middle Eocene)—Dominantly glomero-porphyritic augite + plagioclase porphyritic diabase and basalt sills and dikes that cut Mesozoic basement and basal Tertiary section; may be feeder dikes to basalt of Brown Mountain; some dikes cut tuff of Bond Creek; contact aureoles in Mesozoic rocks developed around largest intrusive bodies. Sills at 10,000 foot depth in the Mobil well east of Sutherlin give K-Ar ages of 33.9± 3.4 and 36.8±3.6 Ma (Ryu and others,

Rhyolite and dacite intrusions (late and middle Eocene)—Dominantly fine grained, aphyric, light gray to white dikes and sills within Remote Member (Twr) of White Tail Ridge Formation. May be feeders for flows in Tia Andesite dikes and sills (late and middle Eocene)—Platy to blocky joint-

ed, aphyric to plagioclase phyric, finely crystalline andesite intruding an-

desite flows of unit Taf and volcanic sedimentary rocks of unit Tvs ROCKS OF THE TYEE BASIN Spencer Formation (late and middle Eocene)—120 m of friable, fine- to very coarse-grained moderately sorted, thick- to very thick-bedded, micaceous, arkosic cross-bedded to laminated sandstone with a few coal beds and carbonaceous mudstone; fluvial-deltaic; some shallow-marine mol-

lusks and carbonized leaves date the unit as late Eocene (Hoover, 1963; Teb Bateman Formation (late and middle Eocene)—750 m of fine- to coarsegrained, moderately indurated, cross-bedded to ripple and parallel laminated to hummocky bedded, micaceous arkosic sandstone; minor overbank mudstone; some sub-bituminous coal and bioturbated sandstone with a few shells of Venericardia (Weatherby, 1991); composed of many thickeningupward parasequences; wave-dominated delta. Unit caps high ridges; in

Tebm Bateman Formation mudstone (late and middle Eocene)—Thin to thick bedded, locally fossiliferous pro-delta-neritic mudstone; interfingers with Bateman sandstone unit in southern part of outcrop area

part age-equivalent to Spencer Formation

Tee Elkton Formation mudstone (middle Eocene)—450 m of laminated, medium to dark gray foram-bearing (bathyal) micaceous mudstone; upper slope to basinal; contains some nested channel sequences of medium- to thick-bedded, amalgamated, graded micaceous arkosic turbidite sandstone and thir mudstone beds; a few thickening-upward beds of shallow-marine, molluskbearing, laminated to hummocky bedded, micaceous arkosic sandstone in lower part. Formation is middle Eocene (upper Ulatisian-lower Narizian foraminiferal stage according to Bird, 1967; equivalent to A-1 stage of Almgren and others, 1988, and coccolith subzone CP12b. Interfingers with the Baughman Member (Ttbs) of the Tyee Formation

Tyee Formation (middle and early Eocene)—Divided into: Baughman Member (middle Eocene)—300 to 600 m of zeolite-cemented, iron-stained, coarse-grained, thick- to very thick-bedded, micaceous, lithic arkosic sandstone; cliff-former; some large-scale cross-bedded pebbly sandstone and polymict conglomerate lenses; represents fluvial to wave-dominated delta. Delta plain facies includes massive, green to carbonaceous-micaceous overbank mudstone and sub-bituminous coal beds; delta front facies contains oyster-bearing estuarine deposits, paralic coal, and thickening-upward delta front parasequences of hummocky bedded, bioturbated to ripple-laminated sandstone. In southern part of map, local unconformity at base with fluvial mudstone chip conglomerate incised into underlying deep-marine Hubbard Creek mudstone; conformable contact toward northern part of the map. Molluscan fossils indicate middle Eocene

Baughman Member mudstone (middle and early Eocene)—Massive, gray green to carbonaceous-micaceous overbank mudstone Hubbard Creek Member (middle and early Eocene)—120 to 300 m of micaceous laminated to massive deep-marine mudstone (lower to upper slope); minor fine-grained, micaceous arkosic, graded, thin- to thick-bedded turbidite sandstone and thin mudstone in nested channel sequence (Tths) with slump structures and mudstone chip conglomerates. Uppermost part of unit is bioturbated shelfal-upper slope mudstone (Ryu and others, 1992). Benthic foraminifers are referrable to middle Eocene (A-1 to G-1 stages of Almgren and others, 1988, according to Ryu and others, 1992). Unit conformably overlies and interfingers with Tyee Mountain Member

mudstone (Tttm) and locally disconformably overlies Camas Valley For-

mation in the southern part of the map area (Black, 1990, 1993)

age (Ryu and others, 1992)

Hubbard Creek Member sandstone (middle Eocene)—Fine-grained, micaceous arkosic, graded, thin- to thick-bedded turbidite sandstone and thin mudstone in nested channel sequences Tyee Mountain Member (middle and early Eocene)—1,500 to 1,800 m of rhythmically bedded, thick- to very thick-bedded to amalgamated, wellindurated, clay-cemented, light gray, micaceous lithic feldspathic sandstone (graywacke) and subordinate thin beds of deep-marine, dark gray mudstone (sandstone to mudstone ratio ranges from 5:1 to 30:1). Bouma abe and ae turbidite divisions common; with mudstone rip-ups, flute and groove marks, and load casts. Graded sandstone beds are medium- to finegrained and generally structureless but display sharp bottom and gradational upper contacts. Very coarse flakes of muscovite and biotite are distinctive of this unit. Some thick slope channel amalgamated turbidite sandstones (20 to 75 m thick) with slumped beds and mudstone-chip conglomerates. Inner and middle submarine fan facies of Chan and Dott (1983) or proximal ramp facies of Heller and Dickinson (1985). Near base, thin- to medium-bedded outer fan turbidite sandstone with some thick laminated micaceous mudstone (Tttm). Mudstone-chip channel turbidite sandstones incised into underlying Camas Valley Formation in the southern part of the map, but turbidite unit thickens rapidly to the north and overlies basin plain facies turbidites of the Tenmile formation. Benthic foraminifers are referrable to the Ulatisian stage, and coccoliths are referrable to the CP-12 zone (middle and early Eocene; Bukry and Snavely, 1988; Ryu and others,

1992; Brouwers and others, 1995) Tyee Mountain Member mudstone (middle and early Eocene) —Thick, laminated micaceous mudstone

Umpqua Group (early Eocene and late Paleocene)—Consists of: Camas Valley Formation (early Eocene)—600 m of outer shelf and upper slope, medium dark gray, laminated mudstone; massive, micaceous; upper 100 m contain some calcareous concretions and shallow-marine mollusks. Unit forms broad gentle sloping valleys. Formation interfingers with and overlies undivided White Tail Ridge (Tw), mainly Coquille River member (Twrc) and locally unconformably overlies Tenmile Formation (Tm). Molluscan assemblages as well as benthic and planktonic foraminiferal assemblages indicate a late-early Eocene age (B-1 foraminiferal stage of Almgren and others, 1988) (Miles, 1977; Moore, 1991; McKeel, 1991, written communication in Ryu and others, 1992). Coccolith assemblages equate to CP-11 zone of Bukry and Snavely, 1988) White Tail Ridge Formation (early Eocene)—Includes:

White Tail Ridge Formation, undivided (early Eocene)— 425 to 1425 m of moderately to well-indurated, ridge-forming hummocky bedded to bioturbated mollusk-bearing delta front-shoreline, fine- to medium-grained, thick- to thick-bedded lithic arkosic sandstone and thin subordinate gray mudstone; some paralic subbituminous coal beds, estuarine oyster-bearing sandstone, tidal flat accretionary bank mudstone, and thin mollusk-bearing siltstone; many coarsening- and thickening-upward parasequences in lower and upper part of the formation. In the middle part of the formation, moderately to well-indurated delta plain and fluvial, planar and large-scale trough cross-bedded, coarse- to very coarse-grained pebbly, channelized, lithic arkosic sandstone, some polymict boulder-cobble-pebble conglomerate (quartzite, chert, metamorphic, and intermediate to mafic volcanics), thick, massive, green, root-mottled overbank mudstone, and subbituminous coals. Some fining- and thinning-upward fluvial sequences. Formation is early Eocene (planktonic foraminiferal zone P10 McKeel, 1991, in Ryu and others, 1992, Penutian-lower Ulatisian benthonic foraminiferal stage; CP-11 coccolith stage, Bukry and Snavely, 1988; Ryu and others, 1992; Brouwers and others, 1995; D. Bukry, written communication, 1993)

Rasler Creek tongue (early Eocene)—150 m of moderately to well-indurated, delta front or shoreline lithic arkosic sandstone; bioturbated to hummocky bedded; a few subbituminous coal and thin gray mudstone interbeds; thickening- and coarsening-upward parasequences; sandstone is fine- to medium-grained and moderately sorted. Unit occurs mainly as a conformable tongue that extends into and pinches out northward into mudstone of the Camas Valley Formation (unit Tcv). Unit grades laterally into thick Tw south of the map area. Tongue is lower Eocene (Ryu and others,

Coquille River Member (early Eocene)—300 m of moderately indurated and sorted, shell-bearing, fine- to medium-grained, bioturbated to hummocky bedded, lithic-arkosic delta front sandstone with thin subordinate gray mudstone interbeds; coarsening- and thickening-upward parasequences common; some lower delta plain, thick, massive, overbank carbonaceous mudstone interbeds, several subbituminous coal beds (0.5 to 2 m), and estuarine, oyster-bearing to shallow-marine bioturbated, mollusk-bearing fine- to medium-grained sandstone (Ryu and others, 1992). Member pinches out to the north and northeast. Basal contact of the member interfingers with underlying Remote Member and locally overlies massive slope and outer shelf mudstone of the Tenmile Formation (unit Tm) Remote Member (early Eocene)—650 m of ridge-forming, multiple

fining and thinning upward sequences (6 to 60 m thick) of coarse- to very coarse-grained pebbly quartzose-lithic-arkosic fluvial (meandering river) to delta plain sandstone, subordinate thick, root-mottled, overbank deposits; massive light gray-green mudstone, dark gray carbonaceous siltstone, and thin coals (Kugler, 1979). Poorly sorted sandstone beds in lower part of member are channelized, lenticular, contain lenses of pebbles in largescale planar to trough cross-beds with some overlying ripple- and parallellaminated thinner sandstone which contains carbonized tree limbs and molds of logs. In the southern part of the map area and in the adjacent 1:100,000 sheet, unit is very thick pebble-cobble-boulder polymict fluvial conglomerate suggestive of a braided stream deposit (Ryu and others, 1992). Minor delta front interbeds of bioturbated shelf shallow-marine sandstone that contain fossil mollusks, including Venericardia and Turritella. Pebbles are rounded to sub-rounded and consist of multicolored chert, graywacke, quartzite, mafic and intermediate volcanic rocks, mudstone rip-ups, and fine pebble chert-quartz conglomerate derived from Mesozoic Klamath Mountains terranes (Koler, 1979; Kugler, 1979; Ryberg, 1984). The thick pebble-cobble-boulder conglomerate incised valley fill in lower part of member is organized imbricated and disorganized matrix-supported debris flow-braided stream deposits that rapidly thin and pinch out northward into typical Remote Member delta plain-meandering river sandstone, mudstone, and coal. The incised valley fill overlies a lo-

cal erosional unconformity cut into the underlying shallow-marine Berry

Creek Member (unit Twbc; Ryu and others, 1992); locally divided into: Mudstone (early Eocene)—Subordinate thick, root-mottled, overbank massive light gray-green mudstone, dark gray carbonaceous siltstone, and

thin coals (Kugler, 1979)

Berry Creek Member (early Eocene)—More than 150 m of well-indurated delta front, hummocky to cross-bedded and bioturbated, molluskbearing, pebbly lithic arkosic sandstone with minor mudstone and thin polymict congomerate beds; many thickening-upward delta front parasequences. Sandstone is fine- to medium-grained, medium gray (fresh) to yellowbrown (weathered) and thick- to very thick-bedded or amalgamated. Pebbles are chert, quartz, metamorphic, and intermediate to mafic volcanic. Member conformably interfingers with underlying mudstone of Tenmile Formation. Molluscan fauna and coccolith flora indicate an early Eocene age (coccolith biozone CP-11; D. Bukry, written communication, 1994; Brouwers and others, 1995; Moore, 1991, in Ryu and others, 1992) Unnamed siltstone member (early Eocene)—Massive to thin-bedded marine mudstone underlying sandstone of Whitetail Ridge in southwest corner of quadrangle; unconformable on folded turbidites of Tenmile Formation; inferred to be deeper marine facies of Whitetail Ridge Formation

Tenmile Formation (early Eocene)—Includes: Tenmile Formation, undivided (early Eocene)—Up to 1,000 m of massive to well-bedded, very thick sequences of deep-marine, well-indurated, dark medium gray, rhythmically bedded, thin, graded, medium- to very coarse-grained lithic turbidites (Bouma abcd and bcd divisions common) and thin dark gray mudstone interstratified with thick bathyal foraminiferabearing, upper to lower slope and basinal, dark gray laminated to massive mudstone; minor medium- to thick-bedded, very coarse-grained, lithic turbidites; some thick lenses and channels of massive, pebbly lithic sandstone to disorganized and organized polymict pebble-cobble conglomerate. Thin mollusk-bearing, upper slope-outer shelf mudstone in upper part of unit (Ryu and others, 1992). Tenmile Formation strata conformably overlie Bushnell Rock Formation. Foraminiferal and coccolith assemblages indicate formation is early Eocene (Penutian foraminiferal stage; Thoms, 1965; Miles, 1977; and CP10 and 11 coccolith stages; D. Bukry, written communications, 1991-96; Brouwers and others, 1995). Lower part of the unit equates to foraminiferal stages C and B-4 to B-1 of Laiming (as described by Almgren and others, 1988; McKeel, 1991 in Ryu and others, 1992) Slope mudstone (early Eocene)—Dark gray slope mudstone with medium gray, thin-bedded lithic turbidite sandstone filling cross-cutting nested

and load structures. Some massive upper slope-outer shelf, massive, dark gray, mollusk-bearing mudstone in upper part; unit overlies basin plain unit Tmm in north-central part of map area Turbidite sandstone and mudstone (early Eocene)—Thin- to mediumbedded(?), lenticular lithic sandstone and dark gray mudstone; grades lateraly into unit Tmcs submarine turbidite channel deposits; possible inner

channels; lenticular sandstone beds, slumped and prolapsed bedding, flame

fan levee deposit Turbidite sandstone (early Eocene)—45 to 150 m of well-indurated, medium- to thick-bedded, fine- to coarse-grained, graded, deep-marine turbidite lithic sandstone, rhythmically bedded, with subordinate thinner, dark gray, even-bedded mudstone; sandstone to mudstone ratio ranges from 2:1 to 5:1; some thinning- and fining-upward as well as thickening- and coarsening-upward sequences; includes a few very thick-bedded amalgamated, massive, medium-grained lithic sandstone with thin discontinuous mudstone. Burrows, load casts, grooves, and flutes on base of some beds; sandstone beds display Bouma abde, abe, and ae divisions and have sharp bottom contacts and gradational upper contacts; and contain mudstone ripups. Ridge-former; turbidite facies C and D of Mutti and Ricci Lucchi (1972) representing submarine mid-fan lobes and channels (Ryberg, 1984; Ryu and others, 1992). Unit is interbedded with and/or overlies units Tmm.

Basin plain mudstone (early Eocene)—Up to 1225 m of foraminiferbearing, chippy weathering basinal mudstone, dark medium gray, laminated to massive; some calcareous concretions and thin intervals of very thinto thin-bedded, fine-grained lithic turbidite sandstone and mudstone; forms condensed section (< 40 m thick) where unit onlaps subaerial paleohighs of Siletz River volcanics that include a basal dark brown, well-cemented basaltic sandstone (up to 35 m thick) shallow-marine and pocket beach de-

Mudstone and turbidite sandstone (early Eocene)—Thick, even-bedded sequences of well-indurated, deep-marine (bathyal) rhythmically bedded, thin to very thin, graded beds of medium gray, fine- to medium-grained turbidite lithic sandstone and dark gray mudstone; sandstone to mudstone ratio ranges from 1:1 to 1:4; some beds contain flute casts, grooves and burrows and Bouma bcde, abcde, and cde divisions; turbidite facies D of Mutti and Ricci Lucchi (1972); outer submarine fan to basinal facies (Ryberg, 1984; Ryu and others, 1992); up to 1,000 m thick. Unit overlies and is interbedded with unit Tmss

Submarine fan channel sandstone (early Eocene)—230 m of well cemented, very thick-bedded, amalgamated, massive to graded, ridge-forming, pebbly, coarse-grained, deep-marine, lenticular, lithic sandstone (with Bouma aa and abe divisions) and some lenses and channels of normal and reverse graded, organized and disorganized, matrix-supported polymict conglomerate (submarine debris flow deposits) and minor thin intervals of dark gray mudstone partings and thin-bedded, lenticular sandstone; some slumped bedding. Sandstone is locally bleached white to buff near faults by hydrothermal fluids associated with mercury mineralization (Wells and Waters, 1934). Conglomerate is very poorly sorted and is composed of rounded to sub-rounded clasts of Klamath Mountains Mesozoic metamorphic, sedimentary, and volcanic rocks. Inner fan and mid fan and lower slope channel and inner fan valley (Ryu and others, 1992). Unit overlies unit Tmss and grades to the southwest into slope turbidite mudstones of

Bushnell Rock Formation (early Eocene)— Divided into: Slater Creek Member (early Eocene)— 640 m of well-indurated, shallow-marine, fine-grained, thick- to very thick-bedded, massive to faintly laminated, gray-green, lithic feldspathic sandstone at the top of the Bushnell Rock Formation. Contains minor dark gray mudstone partings and polymict conglomerate lenses; broken fossil mollusks, scattered pebbles, mudstone rip-ups, worm tube casts, and carbonized wood. Molluscan fossils locally abundant in bioturbated fine sandstone are referrable to the ear-

ly Eocene and indicate a neritic environment (L. Marincovich, written communication, 1993; Brouwers and others, 1995) Bushnell Rock Formation conglomerate (early Eocene)— Unit consists of three lithofacies: Submarine channel deposits - up to 500 m thick consist of well-indurated deep-marine, medium gray, pebble-cobble-boulder polymict conglomerate (mainly quartz, volcanic, and metamorphic clasts); thick- to very thick-bedded, framework-supported, graded and reverse graded; clasts rounded to sub-rounded; some debris flow deposits of sandy clay matrix-supported boulders and cobbles (unit Tbrm) and pebbly. poorly sorted, very coarse-grained, lithic sandstone; minor bathyal foraminifer-bearing, thin, dark gray, laminated mudstone interbeds and minor basaltic conglomerate at base; facies represents deep-marine submarine channels or canyon fills and upper submarine fan valley sequences (Ryu and others, 1992). Alluvial fan lithofacies - locally underlies submarine fan and canyon lithofacies and consists of up to 730 m of ridge- and cliffforming, reddish brown, polymict fanglomerate, debris flow deposits, poorly sorted boulder-cobble-pebble conglomerate, and braided river deposits of cross-bedded to massive framework-supported conglomeratic, coarse-grained lithic sandstone (Ryu and others, 1992). Clasts are domi-

nantly graywacke, chert, quartz, vein quartz, quartzite, phyllite, green-

stone, granitic rocks, and intermediate to mafic volcanic rocks. Minor massive maroon mudstone, ripple-laminated, fine-grained lithic sandstone interbeds. A fan delta facies at top of formation consists of 75 m of nearshore, mollusk-bearing, cross-bedded, moderately sorted, pebbly, mediumto coarse-grained lithic sandstone; polymict conglomerate lenses become more abundant toward the base of this lithofacies. Formation locally contains early Eocene molluscan fossils and sparse benthic foraminifers of early Eocene age (Bulitian and early Penutian foraminiferal stages; Mc-Keel, 1991 in Ryu and others, 1992; Brouwers and others, 1995) and coccoliths referrable to biozone CP10 (D. Bukry, written communication, 1996). Unit is unconformable on both the Mesozoic Klamath Mountains terranes and Paleocene to early Eocene Siletz River Volcanics, but is syntectonic and in places involved in thrusting. Between Winston and Dixonville, the basal Bushnell Rock deep-marine facies (Tbr) is interbedded with submarine pillow lavas of Siletz River Volcanics and is intruded by comagmatic diabase sills. Unit may grade laterally northward into lower part of Tenmile Formation (Umpqua Group of Ryu and others, 1992, 1996) Debris flow deposits (early Eocene)— Very poorly sorted polymict boulder conglomerate containing sub- angular boulders up to 4m in diameter of greenstone, metagreywacke, chert, and basalt in a matrix of basaltic laharic breccia, interbedded with thin lenses of turbidite sandstone and silt-

Siletz River Volcanics (early Eocene and late Paleocene)—Submarine pillow basalt, subaerial basalt, and interbedded volcaniclastic and sedimentary rocks: divided into:

Roseburg Member (early Eocene and late Paleocene)— Sedimentary units that were previously included with pillow basalt in the Roseburg Formation of Baldwin (1974); usage here is restricted to the sedimentary units. Turbidite sandstone and mudstone (early Eocene and late Palecene)—Indurated, rhythmically bedded, thin- to very thick-bedded, medium gray, graded lithic sandstone and subordinate thin to medium beds of dark gray foraminifer-bearing mudstone interbedded with pillow lava and submarine basaltic breccia of Siletz River Volcanics (Tsr). Sandstone beds contain Bouma abcde and bcde divisions, flute clasts, grooves, burrows, load casts, and mudstone rip-ups characterisite of deep-marine environment. Sandstones derived from Mesozoic Klamath Mountains terranes and locally from basaltic source terrane; lithologically similar to younger Tenmile lithofacies. Unit forms interbeds 10 to 100 m thick between flows and becomes the dominant lithofacies to the southwest. Mudstone contains sparse late Paleocene to lower Eocene foraminifers and coccoliths (CP 8 to 10, Ryu and others, 1992; Brouwers and others, 1995; D. Bukry, written communication, 1996).

Conglomerate (early Eocene)—Thick- to very thick-bedded, deep-marine, framework-supported, polymict poorly sorted pebble-cobble-boulder conglomerate interbedded with pillow basalt of Siletz River Volcanics and locally enclosed within pillows; contains sub-rounded to rounded clasts of basalt, quartz, chert, metagreywacke, limestone, and metavolcanic rocks derived from Mesozoic terranes south of Wildlife Safari fault; unit is poorly to moderately sorted, reverse and normally graded, amalgamated to massive, lenticular to channelized beds

Basaltic sandstone (early Eocene)—Dark brownish black to greenish brown, well-cemented basaltic sandstone; massive to thick-bedded, medium- to very coarse-grained, moderately to poorly sorted; locally pebbly and conglomeritic, with zeolite-filled vesicles in clasts; contains broken molluscan and echinoid fossils; interbedded with pillow basalt and locally overlying subaerial basalt; formed as shallow-marine and pocket beach deposits around subsiding oceanic island headlands and basaltic sea stacks of the underlying Siletz River Volcanics

Submarine basalt flows (early Eocene and late Paleocene) — Dominantly aphyric to plagioclase phyric tholeiitic basalt; as closely packed pillow lava, columnar jointed sheet flows, and pillow breccia with flows up to tens of meters thick; basalt is in places amygdaloidal and tectonized, with vesicle and fracture fillings of greenish brown smectitic clay, calcite, quartz, and zeolite; commonly slickensided; flows locally massive and contacts poorly defined, except where interbedded with dark brown basaltic tuffaceous siltstone, turbidite sandstone, polymict conglomerate, and mudflow breccia. Flows are steeply dipping, tightly folded, and at least 6 km thick in Roseburg anticlinorium, with base not exposed; 8900' of basalt and basaltic breccia encountered in Sutherlin Mobil well; basalt is very vesicular, amygdaloidal, and oxidized (subaerial?) near bottom of well at TD of 13,177 feet. Upper part of unit interfingers with conglomerate of Bushnell Rock Formation; pillows locally surround and enclose well rounded clasts of Mesozoic rocks. Mudstone interbeds contain sparse late Paleocene (CP-8) to lower Eocene (CP10) foraminifers and coccoliths (D. Bukry, written communication, 1990-96; Ryu and others, 1992; Brouwers and others, 1995). Along the North Umpqua River near Glide (secs.17 and 18, T26 S., R.4 W.), a mudstone interbed near the top of the pillow basalts contains a foraminiferal assemblage of lowest Eocene age (Bulitian stage; or D stage of Almgren and others, 1988; McKeel, 1990, written commun.). Whole rock K-Ar dates for the Siletz River Volcanics from the Drain area and in the Coquille-Myrtle Point-Remote area just north and west of the Roseburg quadrangle range in age from 62.1 + 1.0 Ma to 59.2 + 2.8 Ma (Duncan, 1982). K-Ar dates of surface samples from these areas analyzed by Mobil Oil Corporation range from 47.2 Ma to 56.5 Ma (unpublished data, courtesy of Bill Seeley), with the youngest dates clustered in the Drain-Jack Creek-Dickinson Mountain area. 40Ar/39Ar analysis of a sample near the bottom of Mobil's Sutherlin well yielded an isochron age of 63.9 + 1.9 Ma (Duncan, 1982), close to K-Ar dates of 58.2 and 56.9± 1.5 Ma for basalt in Mobil's Sutherlin well at depths of 11,340 to 11,350 ft, respectively (unpublished data, courtesy of Bill Seeley). Paleomagnetic data from 19 sites in the Roseburg anticlinorium, Turkey Hill, and Coquille River area are all magnetically reversed (Wells and others, 1985 and this paper, Table X), suggesting eruption sometime during predominantly reversed Chrons 27 to 23 (62.5-51.8 Ma, timescale of Berggren and others, 1995). Subaerial basalt flows (early Eocene and late Paleocene)— Crudely columnar-jointed aphyric and augite and plagioclase phyric flows with weath-

ered and oxidized flow tops, locally with zeolite-filled vesicles and minor dark red oxidized siltstone interbeds; best exposed in railroad cuts across Turkey Hill-Dickenson Mountain anticline where flows overlie pillow basalt and are in turn overlain by fossiliferous basaltic sandstone Basalt tuff (early Eocene)—Massive to blocky and conchoidally fracturing, light gray, white to buff weathering basaltic aquagene tuff; locally displays bedding, with very fine laminations, scour and fill, and graded bedding; some outcrops contain beds of vesicular, altered basaltic glass lapilli and basaltic mudflow breccia. Interbedded with pillow basalt flows and Bushnell Rock Formation conglomerate containing a mix of basaltic and Mesozoic clasts. Interpreted to be submarine tuffs deposited on the flanks

of growing oceanic islands in close proximity to the continent Intrusive Rocks Diabase (early Eocene)—Massive, blocky, to crudely columnar-jointed aphyric to plagioclase phyric, amygdaloidal, plagioclase-augite diabase and basalt; vesicles filled with greenish-brown smectitic clay, zeolite, and quartz; intrudes flows and sedimentary interbeds of Siletz River Volcanics and overlying Bushnell Rock Formation; locally hydrothermally altered along Bonanza fault zone; inferred to be co-magmatic with Siletz River

WESTERN KLAMATH TERRANE

Cretaceous and Jurassic Accretion Complex Dothan Formation (Early Cretaceous and Late Jurassic)—Contains blocks of accreted oceanic crust including greenstone (gs), red and green radiolarian chert of Early Cretaceous to Late Triassic age(?) (cht), shallow marine algal limestone and Late Cretaceous foraminiferal limestone (Albian to

Aptian; Bill Sliter, USGS, 1986, written communication; i.e., Whitsett Limestone of Diller 1898) (ls), along with exotic tectonic blocks of blueschist (bs), eclogite, metagabbro, diabase, diorite and microtonalite (dio), metatuff (mv), and amphibolite (amp); smaller blocks are characterized in the database and are not differentiated on printed maps. Divided into: Turbidite sandstone broken formation (Early Cretaceous and Late Jurassic)—Fine to medium grained, rhythmically bedded and amalgamated sandstone dominated turbidites, sheared and tectonized broken formation: now metamorphosed to zeolite or pumpellyite facies metagreywacke; minor argillaceous mudstone, and locally abundant pebble and cobble conglomerate. Graywackes are quartzofeldspathic to lithic composition with locally abundant biotite; 5-12% potassium feldspar, abundant calcite and zeolite veins, generally resistant and forms steeper slopes. Represents a post-Nevadan highly folded trench and trench-slope basin deposit metamorphosed during the Cretaceous; mapped as Sixes River terrane by Blake (1984) and Blake and others (1985); contains small blocks of fresh microtonalite that Mobil Oil Corporation K-Ar dated (whole rock) as 147.4 + 5.4 Ma and 174.5 + 4.5 Ma, or Jurassic (unpublished data from Mobil courtesy of Bill Seelev)

Mudstone matrix melange (Early Cretaceous and Late Jurassic)— Scaly mudstone matrix melange and sheared phacoidal blocks of greywacke forming narrow zones of intense deformation in sandstone broken formation (KJda) and as broad areas of mixed melange and broken formation; matrix contains coccoliths of Early Cretaceous age south of Wildlife Safari fault 1 km east of I 5 (D. Bukry, written communication, 1993); Graywackes are micaceous quartzofeldspathic to lithic composition, contain about 3-7% potassium feldspar, quartz veins tend to dominate

Phyllitic siltstone and metagreywacke (Early Cretaceous and Late Jurassic)—Phyllitic siltstone, fine and medium grained metagraywacke, argillaceous mudstone with minor pebble and cobble conglomerate, blocks of accreted oceanic crust that includes greenstone, pillow basalt, radiolarian chert, weakly to moderately foliated where thick-bedded, semi-schistose where thin-bedded, pumpellyite facies metamorphism; detrital potassium feldspar absent

Semischist and phyllite (Early Cretaceous and Late Jurassic)—Slate, phyl litic siltstone, fine and medium grained metagreywacke, weakly to moderately foliated where thick-bedded, semi-schistose where thin-bedded; exhibits pumpellyite facies metamorphism, argillaceous mudstone with minor pebble and cobble conglomerate. Graywackes are micaceous feldspathic to lithic in composition and locally contain abundant detrital epidote, white mica, chlorite and lesser biotite, rare detrital quartzo-feldspathic clasts containing fine-grained euhedral brown hornblende; locally orangered weathering

Jurassic Continental Arc Complex and Sedimentary Cover Myrtle Group (middle Cretaceous to Late Jurassic?)—divided into: Days Creek Formation (middle and Early Cretaceous)—Bedded and massive arkosic sandstone and siltstone; generally friable, arkosic composition. Locally contains Inoceramus anglecus of Late Albian age and elsewhere, Buchia Pacifica of lower and middle Valanginian age (William Elder, written communication, 1993) and tubular fossils or burrows. Unit represents forearc or foreland mass flow and channel deposits that were deposited during the waning stages of the Nevadan orogeny or just following.

Riddle Formation (Early Cretaceous to Late Jurassic?)— Well bedded pebble to cobble conglomerate, volcanic sandstone and shale turbidites and mass flow deposits; locally interbedded tuffacous sedimentary rock and volcanic breccia near the base; Unit unconformably overlies Rogue Volcanics. Contains abundant Buchia uncitoides of Lower Cretaceous, (Berriasian age) and possible Buchia elderensis or piochii of Upper Jurassic, Tithonian age (William Elder, written communication, 1993); locally div-

Conglomerate (Early Cretaceous to Late Jurassic?)— Conglomerate dominated by volcanic and dark chert-rich clast types: unit is unmetamor phosed and moderately indurated; locally silicified with quartz veins near major faults, thin-bedded siltstone and shale slightly concretionary, locally very fossiliferous and bioturbated. Conglomerate clasts are very wellrounded, poorly sorted and consist predominantly of mafic and felsic volcanic rock, dark to gray chert, diabase and volcanic sandstone

Metasedimentary rock (Early Cretaceous and Late Jurasic) — Semischistose to schistose and phyllonitic metasedimentary rock that occurs along a major fault zone. The unit is inferred to be tectonized Dothan Formation Augen gneiss (Cretaceous and/or Jurassic?)—Strongly foliated, banded medium-crystalline rock consisting predominantly of hornblende-rich and plagioclase + quartz rich layers. This rock appears to be tectonized hornblende diorite that has undergone cataclasis and sub-mylonitic deformation KJhf Mafic silicified hornfels (Cretaceous and/or Jurassic)— Hornfelsic silicified mafic intrusive rock and local coarse crystalline pegmatic hornblende

Mesozoic Intrusive Complex KJi Intrusive rocks (Cretaceous and/or Jurassic)— Granodiorite, quartz diorite, diorite and hornblende diorite, generally massive, unfoliated or only very weakly foliated, white weathering, very deeply weathered; commonly friable; commonly uralized or weakly metamorphosed to lower greenschist facies; quartz diorite includes accessory apatite, sphene, trace white mica, green chlorite, and epidote. Green hornblende and biotite are the principal mafic phases. Quartz ranges from a few percent to about 30 percent Granodiorite (Cretaceous and/or Jurassic)—White weathering, coarse and medium grained quartz, plagioclase, microcline, hornblende + biotite bear-

ing granodiorite. Commonly static or unfoliated to very weakly foliated KJhd Hornblende diorite (Cretaceous and/or Jurassic)—Medium to coarsely crystalline hornblende diorite composed of plagioclase (andesine), hornblende, minor or no quartz, and accessory magnitite and ilmenite, with secondary epidote and chlorite

Diorite (Cretaceous and/or Jurassic)—Medium to coarsely crystalline mafic hornblende diorite composed of hornblende and plagioclase, with accessory magnitite, ilmenite, and secondary epidote and chlorite KJdt Tectonized diorite (Jurassic and/or Cretaceous)— Strongly foliated cataclastically and ductilely strained dioritic rock; locally abundant dark mafic dikes that are boudined, lenticular or completely transposed into the foliation direction, strain fabric developed under moderate greenschist facies; biotite, chlorite and epidote are present in tension fractures and replacing igneous hornblende and plagioclase in foliation surfaces; this fabric locally overprinted by secondary silicification and metamorphism

Metamorphic complex (Jurassic or older)—Includes mafic foliated rocks that were country rock to Cretaceous and/or Late Jurassic intrusives (KJi); locally includes rock with tectonite fabrics that range from weakly foliated to augen gneiss, commonly lineated, nubbly whitish weathering, commonly deeply weathered and disaggregated; locally cut by abundant siliceous and keratophyric dikes Jrv Rogue Volcanics? (Late Jurassic?)— Extrusive and hypabyssal intrusive rocks of mafic and intermediate composition, metamorphosed to lower greenschist facies, commonly very fine grained aphyric or plagioclase-pyroxene porphyry, extrusive rocks commonly amygdaloidal, rare thin bedded inter-

pillow breccia texture. Locally hydrothermally altered and leached of mafic constituents Mafic intrusive unit (Late Jurassic?)—Intrusive rocks, intermediate to mafic in composition (gabbro and diorite) here considered to be part the intrusive

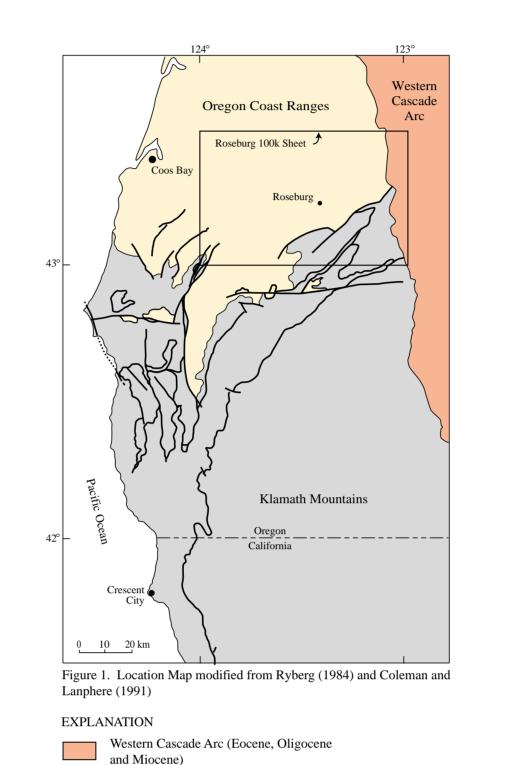
mediate and siliceous, thin-bedded, crystal-lithic, plagioclase phyric tuffs.

Dense, dark green where fresh, weathers rusty, locally contains pillow and

equivalent rocks to the Rogue volcanics, generally medium to coarse grained, metamorphosed to pumpellyite facies and lower greenschist facies. Unit tends to weather dark rusty red Schistose Rogue Volcanics? (Late Jurassic)—Extrusive and hypabyssal intrusive rocks of mafic and intermediate composition with penetrative cataclastic and/or schistose fabric, commonly very fine grained aphyric or plagioclase-pyroxene porphyry, extremly rare thin bedded intermediate and siliceous, thin-bedded, crystal-lithic, plagioclase phyric tuffs locally. Dense, dark green where fresh, weathers rusty, locally contains pillow and pillow breccia texture; metamorphosed to pumpellyite facies and/or lower greenschist facies, with epidote, chlorite, sphene-bearing assemblages Schistose mafic intrusive unit (Late Jurassic?)—Intrusive rocks, intermediate to mafic in composition (gabbro and diorite, minor quartz diorite), generally medium to coarse grained, metamorphosed to pumpellyite facies and/or lower greenschist facies, epidote, chlorite, sphene-bearing assemblages; penetrative cataclastic and or schistose fabric. Unit weathers dark rusty Jrs Serpentinized ultramafic rock (Jurassic?)—Commonly foliated dark to pale

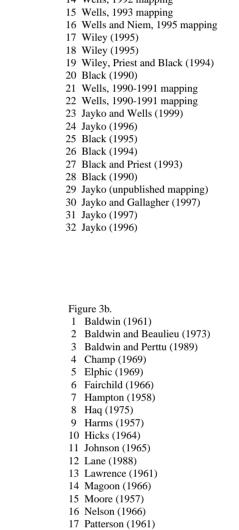
locally occurs in fault zones

green serpentinized peridotite and serpentinite, where fresh weathers rusty,



Oregon Coast Ranges (Paleocene and

Klamath Mountains (Mesozoic)



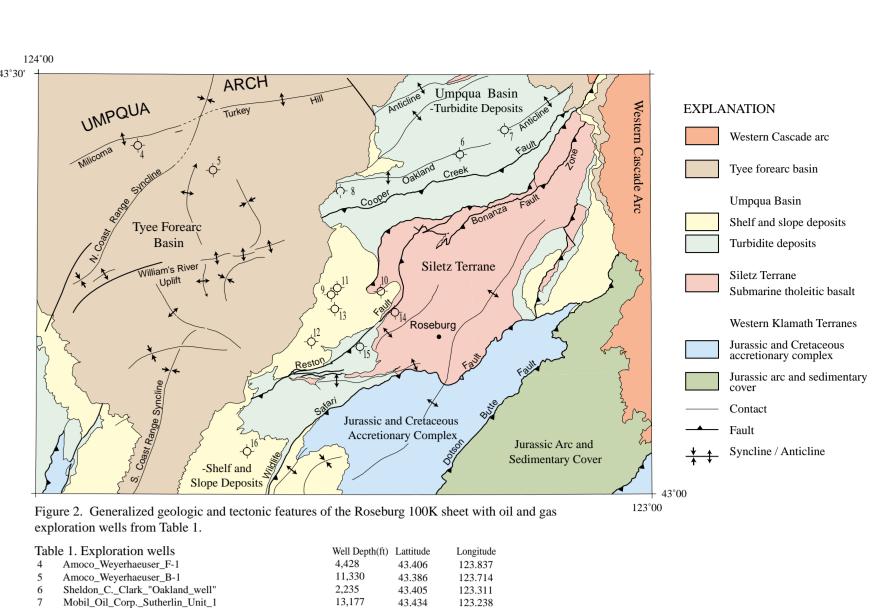
26 Diller (1898)

27 Wells and Waters (1934)

8 Union_Oil_Co._Liles_1

9 Hutchins_&_Marrs_Glory_Hole_

10 Community Oil & Gas Co. Scott 1



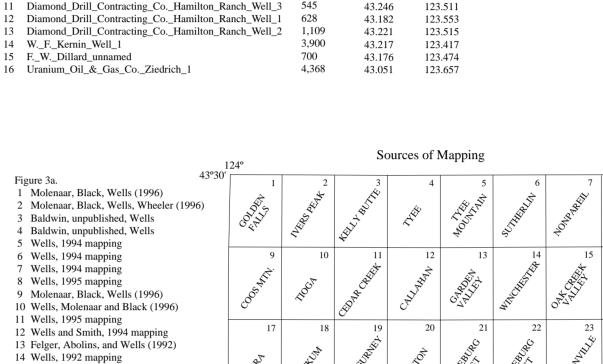
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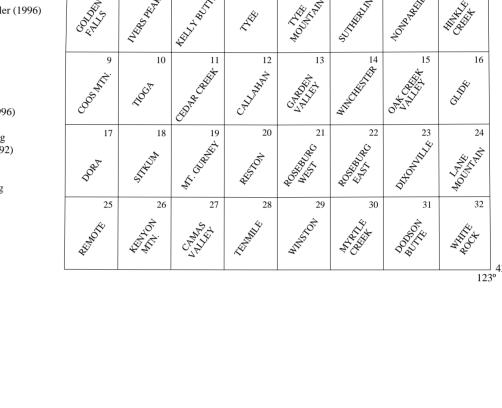
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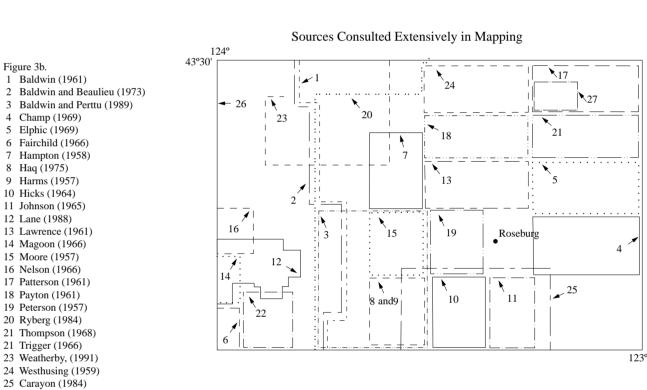
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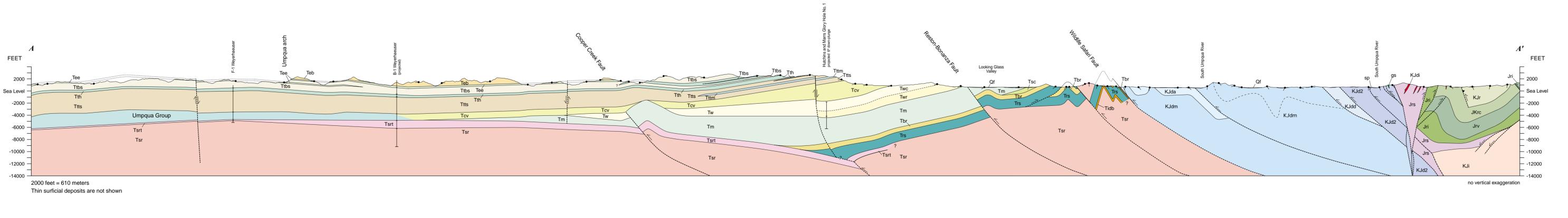
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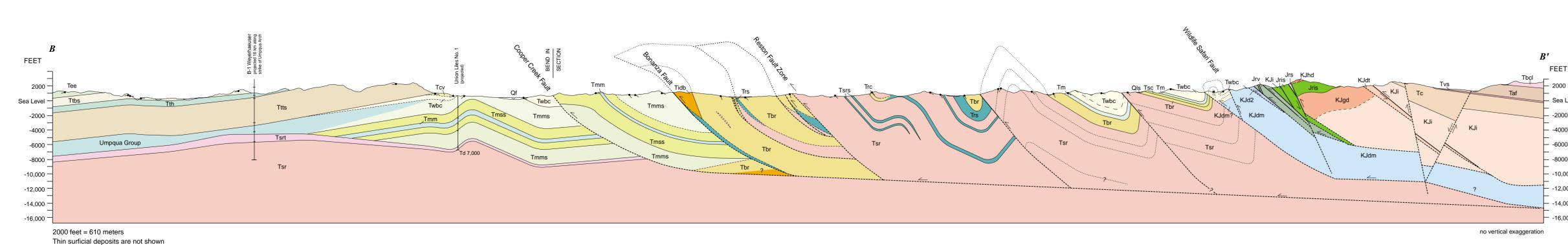
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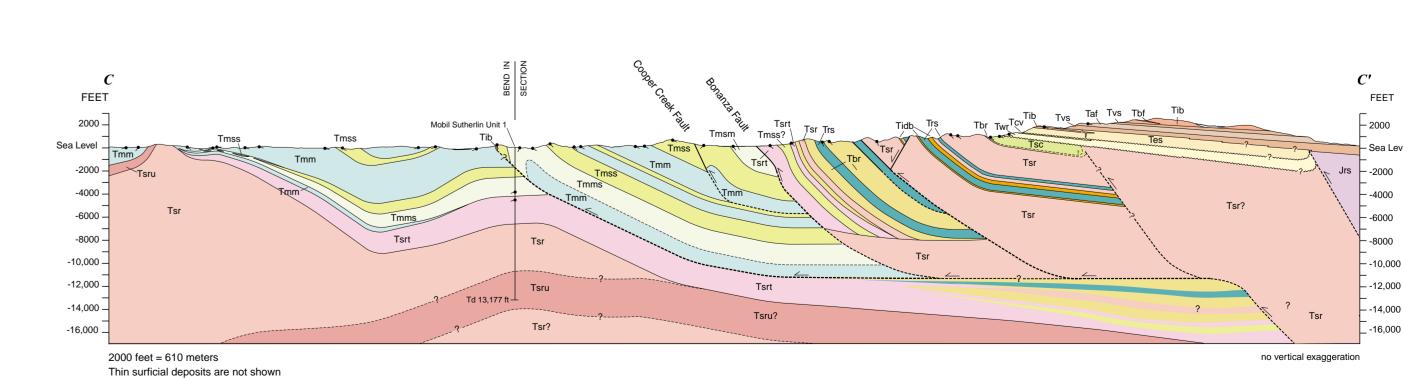












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